Space Weather Forecast

Issued on Friday, 22 March 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely (R1-R2 Radio blackouts), slight chance of strong flares (R3 blackouts). Chance G1/Minor Storm from the arrival of fast solar winds day 3 (24 Mar).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low, with the largest flare at common class, peaking at 21/1819 UTC from a simplifying sunspot in the northeast. Frequent common class flares have also been observed from the large sunspot region in the southeast. There are currently ten sunspot regions on the visible disc however this region is the most notable, with ongoing development, consisting of a number of small spots which are gradually merging into larger ones. There is also mixing of the magnetic polarities and despite the recent lack of flaring, the spot continues to grow in size. The other spots on the disc remain smaller and simpler, with little growth.

A broad eruption was observed off the northeast disc around 21/1800 UTC. This was due the lifting of a "filament", which is a line of material held close to the Sun's surface by its magnetic configuration. This coronal mass ejection (CME) has been assessed as missing Earth, to the north and east. No other potentially Earth-directed CMEs have occurred.

Solar Wind / Geomagnetic Activity: Ongoing effects of the 17 Mar CME were observed at first, before a return to ambient slow wind conditions. Solar wind speed was at background 320-380 km/s. Interplanetary Magnetic Field (IMF) was initially Moderate easing slightly by the end of the period. The north-south component was moderately negative (southward) at first. After a brief moderate positive (northward) switch this showed a gradual rotation to mainly positive values by the end of the period. Geomagnetic activity was Active (Kp4) at first, with one G1 Minor Storm interval 21/1500-1800 UTC. Activity then eased to be Unsettled (Kp3) from 22/00000 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity expected with a likelihood of isolated Moderate flares. There is a slight chance of isolated Strong flares, from AR3615.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. The next notable enhancement will be from the arrival of the fast winds of a coronal hole most likely on day 3 (24 Mar), with slightly elevated to elevated solar winds forecast (450-500km/s). Mainly Quiet geomagnetic activity is expected until this arrival. Activity then becoming Unsettled to Active with a chance of isolated G1 Minor Storm intervals, most likely day 3 (24 Mar). Activity then easing to be mostly Quiet to Unsettled with a slight chance of Active intervals by the end of the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background levels with no solar radiation storms expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	1	5	50	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	55	50
Very Active	R3 to R5 X	No	15	15	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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